## **CLAIMS**

- 1. A method for improving the uniformity of a tire comprising the steps of:
  - (a) Determining a set of vector coefficients corresponding to the after cure radial force variation of a tire, comprising the sub-steps of:
    - (i) Recording a loading angle of a tire carcass on a measurement fixture
    - (ii) Measuring the before cure radial runout of a plurality of finished tires,
    - (iii) Recording a loading angle of said finished tires in a curing mold and curing said tires,
    - (iv) Measuring the after cure radial force variation for each of said tires.
    - (v) Extracting at least one harmonic of the radial runout and of the radial force variation of said tires,
    - (vi) Determining a set of vector coefficients relating the before cure radial runout to the after cure radial force variation of said tires cured in said mold,
    - (vii) Storing said vector coefficients,
  - (b) Estimating the after cure uniformity of an individual tire comprising the sub-steps of:
    - (i) Recording a loading angle of a carcass of said individual tire on said measurement fixture
    - (ii) Measuring the before cure radial runout of said individual tire,
    - (iii) Choosing a harmonic of radial force variation to be optimized,
    - (iv) Extracting a harmonic of radial runout of said individual tire,
    - (v) Estimating a tire room effect vector of the radial force variation corresponding to said harmonic,
    - (vi) Estimating a curing room effect vector of the radial force variation corresponding to said harmonic,
  - (c) Optimizing the after cure uniformity of an individual tire comprising the sub-steps of:
    - (i) Determining an azimuth of said tire room effect vector and of said curing room effect vector,
    - (ii) Aligning the angular position of said individual tire such that said azimuth of said tire room effect vector opposes said curing room effect vector, and
    - (iii) Placing said individual tire so aligned in said curing mold and curing said tire.

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- 2. The method for improving the uniformity of a tire according to Claim 1, wherein said measurement fixture is a tire building drum.
- 3. The method for improving the uniformity of a tire according to Claim 1, wherein said measurement fixture comprises a tangential imaging means.
- 4. The method for improving the uniformity of a tire according to Claim 1 wherein a pair of said vector coefficients corresponds to a building drum vector.
- 5. The method for improving the uniformity of a tire according to Claim 1, wherein a pair of said vector coefficients corresponds to a tire gain vector.
- 6. The method for improving the uniformity of a tire according to Claim 1 wherein a pair of said vector coefficients corresponds to an intercept vector.
- 7. The method for improving the uniformity of a tire according to Claim 1 wherein a pair of said vector coefficients corresponds to said curing room effect vector.
- 8. The method for improving the uniformity of a tire according to Claim 1 wherein said tire room effect vector comprises the vector sum of a before cure tire effect vector, a building drum vector, and an intercept vector.
- 9. The method for improving the uniformity of a tire according to Claim 1 wherein a before cure tire effect vector comprises a vector product of a tire gain vector and a green tire radial runout vector of said harmonic.
- 10. The method for improving the uniformity of a tire according to Claim 1, wherein the sub-steps of determining said vector coefficients are performed in a simultaneous step.
- 11. The method for improving the uniformity of a tire according to Claim 10, wherein said simultaneous step comprises a multivariate least-squares regression.
- 12. The method for improving the uniformity of a tire according to Claim 1, further comprising the steps of recording an identifier for a specific building drum and for a specific curing cavity

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- 13. The method for improving the uniformity of a tire according to Claim 12, wherein each of said steps of determining a set of vector coefficients, estimating the after cure uniformity, and optimizing the after cure uniformity comprises a multivariate least-squares regression of a set of matrix equations corresponding to multiple building drums and multiple curing cavities
- 14. The method for improving the uniformity of a tire according to Claim 1, wherein the step of determining a set of vector coefficients further comprises the sub-step of recording a loading angle of a cured tire on a uniformity measurement machine.
- 15. The method for improving the uniformity of a tire according to Claim 1, wherein a pair of said vector coefficients corresponds to a uniformity machine vector
- 16. The method for improving the uniformity of a tire according to Claim 1, wherein the step of determining a set of vector coefficients is repeatedly updated using data from said individual tire.
- 17. The method for improving the uniformity of a tire according to Claim 1, wherein said step of determining a set of vector coefficients and said step of optimizing the after cure uniformity are carried out using the first through fifth harmonics.